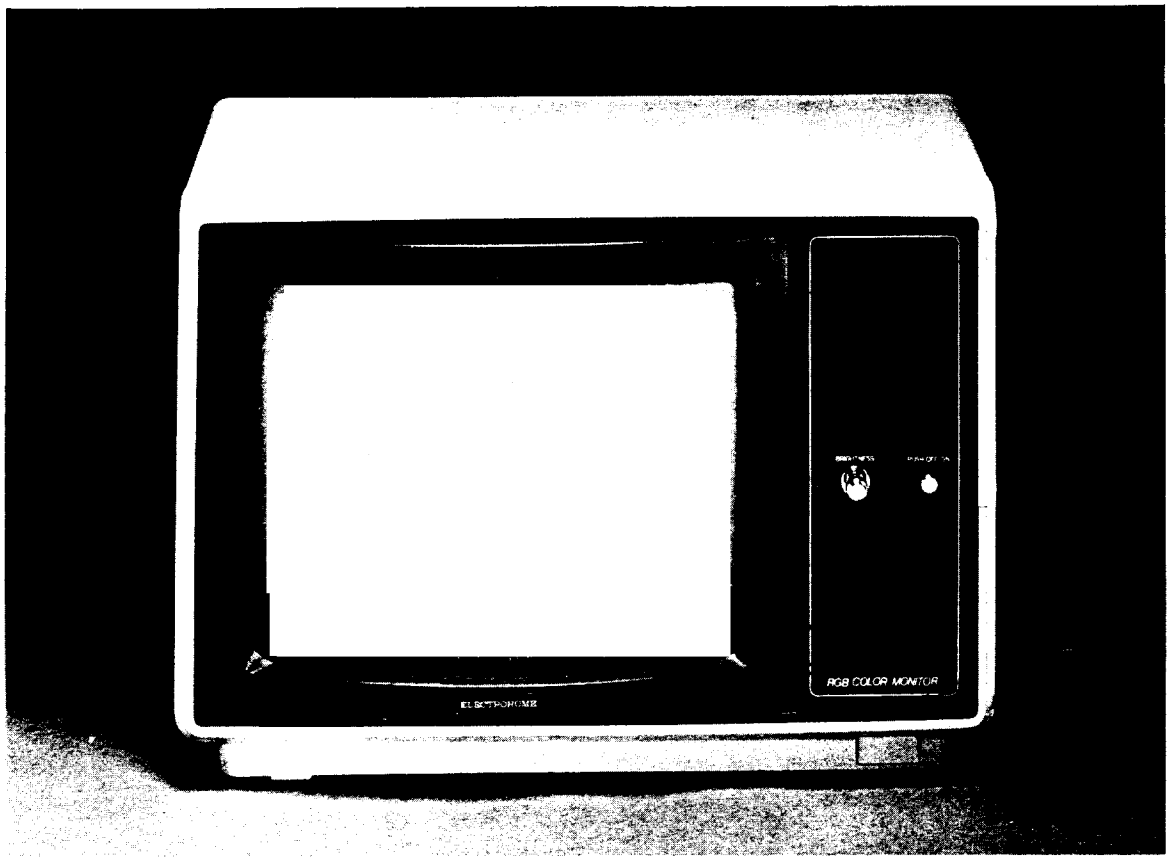
COMMERCIAL MARKETING

ELECTROHOME ELECTRONICS



54-7345-01 (Issue 1)

THIS INFORMATION IS UP TO DATE AS OF JANUARY 1982.

INSTRUCTION AND SERVICE MANUAL

G12 COLOR MONITORS

THIS MANUAL APPLIES TO MODELS ECM1302-1(G12-002), ECM1302-2(G12-003), ECM1302-1X(G12-102), ECM1302-2X(G12-103)

ELECTROHOME LIMITED - 809 WELLINGTON ST. N., KITCHENER, ONTARIO, CANADA N2G 4J6
- 250 WALES AVE., TONAWANDA, N.Y. 15150

ZZ-734501-01
MONITOR 1982-1

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LINE VOLTAGE SELECTION– G12-102, G12-103

Caution: Before changing the voltage setting of the voltage selector switch, disconnect monitor from power line.

The voltage setting can be seen through the large slot located approximately 2" from the bottom of the back cover and in line with the right hand edge of the signal input panel.

Insert a blade screw driver in the voltage selector switch and turn until the desired setting appears in the slot. e.g. if 240 Volt is desired turn until 240 appears in the slot.

WARNING

1. X-Radiation

   This chassis has been designed for minimal x-radiation hazard. However, to avoid possible exposure to soft x-radiation it is IMPERATIVE that the EHT circuitry IS NOT modified.

2. High Voltage

   The colour monitor contains HIGH VOLTAGES derived from power supplies capable of delivering LETHAL quantities of energy. To avoid DANGER TO LIFE, do not attempt to service the chassis until all precautions necessary for working on HIGH VOLTAGE equipment have been observed.

3. CRT Handling

   The picture tube encloses a high vacuum and due to the large surface area is subject to extreme force. Care must be taken no to bump or scratch the picture tube as this may cause the tube to implode resulting in personal injury and property damage. Shatter-proof goggles must be worn by individuals while handling the CRT or installing it in the monitor.
   Do not handle the CRT by the neck.

4. To prevent fire or shock hazard DO NOT EXPOSE THIS MONITOR TO RAIN OR MOISTURE.

1.0 Performance and Operating Data

		Min – Max
1.1	**Supply**	
	Voltage	108 VAC - 132 VAC
	Frequency	44 Hz - 63 Hz
1.2	**High voltage (EHT)**	
	For 13" V Models	19.5KV - 22.5KV

2.0 Input Signal and Pin Assignments for 7 Pin Din Socket

Pin No.	Description	Impedance	Input Signal
1	Red Input	1.4K nom.	3.0V p-p nom.
2	Green Input	1.4K nom.	3.0V p-p nom.
3	Blue Input	1.4K nom.	3.0V p-p nom.
4	Blanking pulse (output)		6.0V p-p nom.
5	Pos. Comp. Sync	2.5K nom.	3.0V p-p nom.
6	16 Volts		
7	Ground		

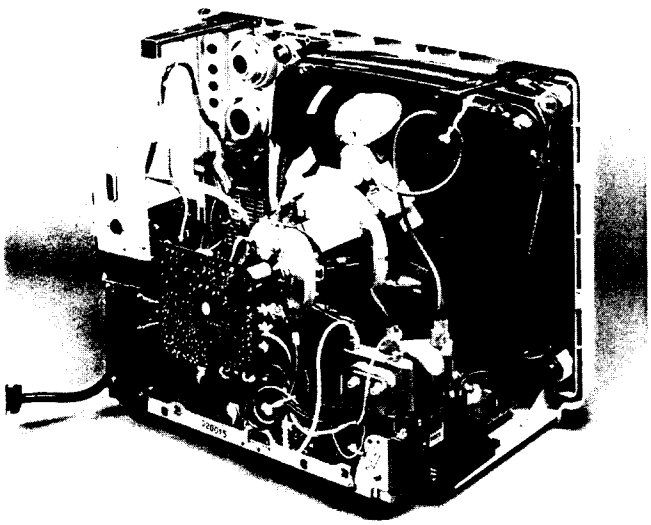
3.0 **Input Signal and Pin Assignment for 15 Pin Connector**
(directly compatible with "APPLE III" signals)

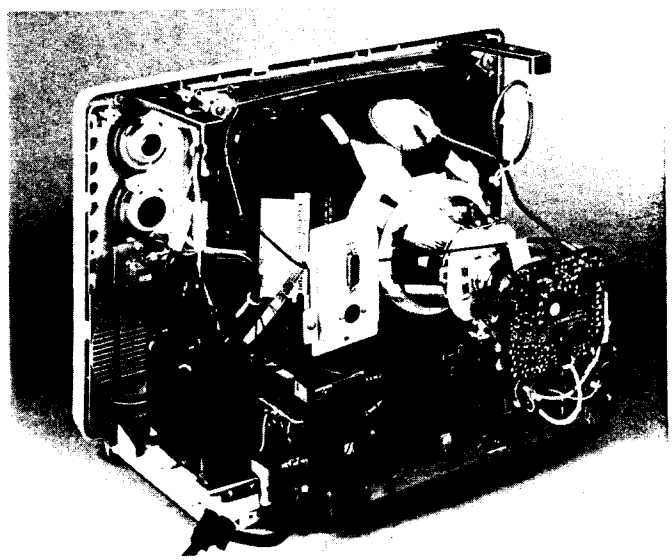
Pin No.	Description	Impedance	Input Signal
2	XRGB4		3.5V p-p nom.
3	Neg, Comp. Sync		3.5V p-p nom.
5	XRGB 1		3.5V p-p nom.
9	XRGB 2		3.5V p-p nom.
10	XRGB 8		3.5V p-p nom.
13	Ground		

XRGB is a TTL signal with instantaneous color information. A linear-weighted sum of these four signals will form a true 16 - color RGB video signal.

The four XRGB signals are resistively matrixed to form the three RGB color signals.

The 7 pin DIN socket is povided so that various computers can be connected to the ECM1302 monitors via an appropriate interface.





REAR CHASSIS VIEW

4.0 CIRCUIT DESCRIPTION

4.1 INPUTS

(a) APPLE III INPUTS

The 15 pin subminiature "D" connector is designed to handle direct connection to the Apple III computer. The Apple III puts out 4 colour data lines, which are matrixed through R201 to R210 inclusive in the G12 to give the Apple III designated colour set.

(b) RGB INPUT

This is through a 7 pin "DIN" connector. The inputs are designed to accept analog signals (signals with more than 8 colours, e.g. 16 colours 256 colours etc.). The level to give black is 0.5 volts, peak white is 3.5 volts. It will also accept digital signals. On this connector, sync is positive, and a 16 volt supply is available for powering interface circuitry. The horizontal pulse output is for use with some Electrohome interface modules.

4.2 VIDEO AMPLIFIERS

The First two stages of video amplification, X101 and X102, X103 and X104, X105 and X106, on PCB SU 1110A match the gain to the video output stages, invert the signal, shift its level, and offer isolation between the input and the video output stage. The video output stage (X101, X102, X103 on PCB SU 3016A) operates as a class A amplifier, with a gain of 24 times. Provision is made for color temperature adjustment through the cutoff and drive controls, R113, R105, R114, R106, R115, on PCB SU 3016A.

The brightness control is implemented by adjusting the base voltage of the video outputs, through the brightness control, R01 and X303. This changes the signal level required for cathode cut off on the CRT.

4.3 SYNCHRONIZATION

The G12 is capable of operating from both positive and negative composite sync. X301 takes negative sync and inverts it, acting as a buffer stage. X302 takes positive syn, or the inverted negative sync (positive sync) form X301, and amplifies and inverts it. It is fed to IC501, where it is separated, and processed to generate the appropriate wave forms for driving the horizontal and vertical output stages.

4.4 VERTICAL DEFLECTION

The vertical drive signal is generated on pin 2 of IC501, and directed to the vertical output transistors, X401 and X402, and to the vertical deflection yoke. Vertical frequency is set by the time constant on pin "7" through C406 and R403, R423, and R422. Vertical hieght is adjusted by feeding back a portion of the delfection ouput signal into the vertical oscillator buffer amplifier.

The vertical linearity is adjusted by feeding a portion of the parabolic signal formed by R419 and C411 back to pin 3 of IC501.

4.5 HORIZONTAL DEFLECTION AND HIGH VOLTAGE

The horizontal frequency generation, AFC and deflection signal shaping are accomplished in IC501. The horizontal output waveform from pin 10 on IC501 is fed to the horizontal driver transistor, C501; the driver output is transformer coupled to X01, the horizontal output transistor. The horizontal deflection yoke is connected directly to the collector of the horizontal output transistor. The high voltage is generated in T502 flyback transformer, through transforming the horizontal output pulse. The focus voltage, screen supply voltage, video output supply and 12V DC voltage are also generated from the flyback transformer.

4.6 PROTECTION CIRCUITS

6.1 X-ray Protection is accomplished through X701, which senses the supply voltage for the Horizontal output transistor, and shuts down the horizontal oscillator and hence the high voltage (EHT) supply.

6.2 Beam Limiter - The Beam current is sensed by X304 through the low voltage end of the flyback transformer, and if it becomes excessive, the bias level on the base of the video output transistor is reduced, and the beam current limited.

4.7 POWER SUPPLIES

The high voltage horizontal deflection and vertical deflection circuits are supplied by a series regulator type 120 volt supply. The power for the video and sync preamplifiers comes form a 12 volt winding on the flyback transformer. The 6.3V filament voltage comes from a separate flyback winding. The 180 volt video ouput supply comes from a tap on the flyback primary winding.

5.0 PRODUCT SAFETY AND SERVICING GUIDELINES

Safety Checks

Subject: Fire and Shock Hazard

1. No modification of any circuit should be attempted. Service work should be performed only after you are thouroughly familiar with all of the following safety checks and service guidelines. To do otherwise increases the risk of potential hazards and injury to the user.
2. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuitry area. Where a short circuit has occurred, replace those components that indicate evidence of overheating. Always use the manufacturer's specified replacement component. See parts list in the back of this manual.
3. Periodically check the high voltage for proper value using a meter of know accuracy and calibration.
4. Check for frayed insulation on wires.

5.1 Cabinet Removal

To gain access to the printed cirucit boards and chassis the rear part of the cabinet has to be removed.

Remove the seven screws holding the rear part of the cabinet to the mask:

2 — top, 2 - input connector panel
1 — below input connector panel and
2 — at bottom of cabinet

After the screws have been removed pull the rear part back. Remove the clamp holding the line cord in place.

All service and set-up controls are now accessible.

5.2 Set-up Controls

Vertical linearity R406
Vertical height R408
Vertical hold R422
Horizontal hold R504
Horizontal centering tabs, 3 positions

CRT Cut off controls
- Red cut off, R114
- Green cut off, R115
- Blue cut off, R113

Video Drive Controls
- Red drive, R105
- Green drive, R106

Focus control R11 and screen control

5.3 CRT, Yoke and Convergence Assembly

CAUTION: Always wear safety glasses when removing or installing CRT. Never lift CRT by neck.

If the CRT has to be replaced proceed as follows:
- Disconnect the following:
(a) Printed circuit board from CRT.
(b) Yoke plug (located behind the flyback transformer)
- Place the CRT face down on a felt pad
- Remove the four screws holding the CRT to the mask. Remove the aquadac strap and lift out the CRT.

To install a new CRT reverse the process. Be careful to install and dress the aquadac strap as it was on the original CRT.

NOTE: The CRT has the yoke and convergence magnets assembled to it. The whole assembly is preconverged. No further adjustments are normally required. If, however, some touch-up is desired refer to the set-up procedure.

For ordering information see the parts list.

6.0 SERVICE SET-UP PROCEDURE

NOTE: All monitors are equipped with automatic degaussing coils which effectively demagnetize the picture tube each time the monitor is turned on. The degaussing coils will operate any time the set is turned on after having been off for at least five minutes.

The degaussing effect is confined to the picture tube since the coils are mounted on the ferrous tube shield. Should any part of the chassis or cabinet become demagnetized, it will be necessary to degauss the affected area by means of a manual degaussing coil. Move the coil slowly around the CRT face area, then slowly withdraw for a distance of six feet before disconnecting the coil from the AC power supply.

Noramlly little, if any adjustment should be necessary. However, when a picture tube, yoke or similar component is replaced, preliminary static convergence should be done before attempting purity adjustment, and so on.

Set up should be done in a north/south direction. Horizontal and vertical centering taps should be set to the centre position if a major component has been changed.

6.1 Purity
Loosen yoke retaining clamp (figure 2) Remove adhesive material fixing wedges to CRT. Remove wedges completely and clean off dried adhesive from picture tube and wedges.

6.2 A small quantity of "nail polish" has been used to lock the purity convergence rings in place. This seal must be broken with a sharp tipped instrument before any adjustments are attempted. Some models also use a locking ring at either end of the purity and convergence rings. This must be loosened before adjustments are made. It goes without saying that upon completion of all adjustments, lock must be reset and/or a dab of paint or nail polish must be reapplied to edge of rings to prevent movement.

6.3 Connect an appropriate signal source, eg: Electrohome RGB generator producing a white field plus individual red, green and blue fields.

6.4 Bring the long and short purity tab protrusions in line with each other to obtain near-zero magnetic field (figure 4) (In some cases bring the flat and indented tabs together to obtain zero field). Protrusions can then be vertical, horizontal or at any convenient angle to start.

6.5 Turn off the green and blue fields and ajust setup controls to produce a red field. (See fig. 3)

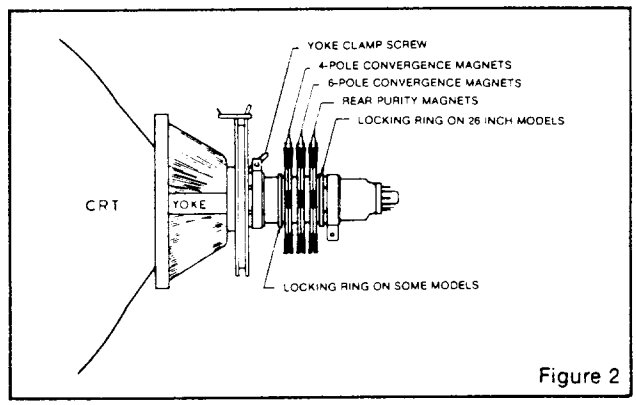


Figure 2

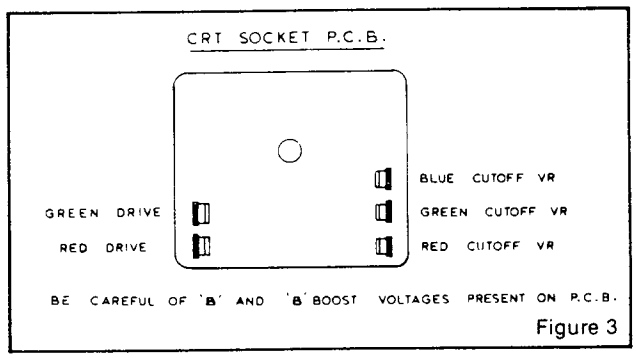


Figure 3

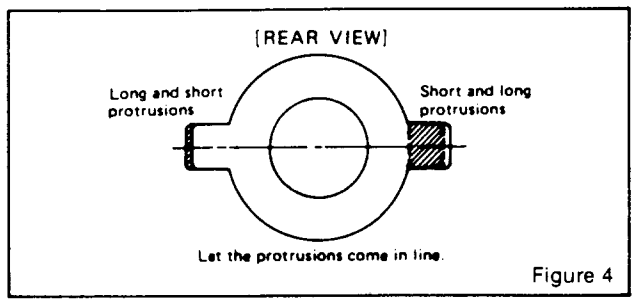


Figure 4

6.6 Pull the deflection yoke back so that a red band appears in the centre of the screen.

6.7 Spread the tabs apart as little as necessary and rotate both rings together to center the red band horizontally on the face of the CRT (approximate). (See fig. 5)

6.8 Slide the yoke towards the bell of the picture tube slowly to obatin a uniform red field (pure in color) across the entire tube face. Juggle back and forth slightly as necessary. Lightly tighten yoke retaining clamp.

6.9 Momentarily switch on a cross-hatch signal and rotate yoke to level the pattern on the face of CRT.

6.10 Return generator to regain red raster.

6.11 Turn off red field and check for pure field for each of the green and blue fields. Reposition yoke if necessary to obtain optimum purity on all fields.

6.12 Tighten yoke retaining clamp to prevent yoke shift or rotation. (Do not install wedges at this time.)

7.0 Static and Dynamic Convergence

NOTE: Static convergence is achieved by four magnets located on the neck, nearest the base of the picture tube, Fig. 2. The middle pair of magnetic rings are adjusted to converge the blue and red crosshatch lines. The rear pair of convergence rings (closest to the base of the picture tube) are adjusted to converge the magenta (blue/red) to the green crosshatch lines. Dynamic convergence is achieved by tilting the deflection yoke up-down and left-right.

7.1 Ensure that the controls misadjusted during purity setup (screen, cut-off, etc.) are set to give white balance. See 3.0 below.

7.2 Switch generator to the crosshatch pattern.

7.3 Adjust convergence around the edges of the picture tube by tilting the yoke up-down and left-right, and temporily install one wedge at the top of the yoke or in a more optimum position. (Figures 8, 9, 10)

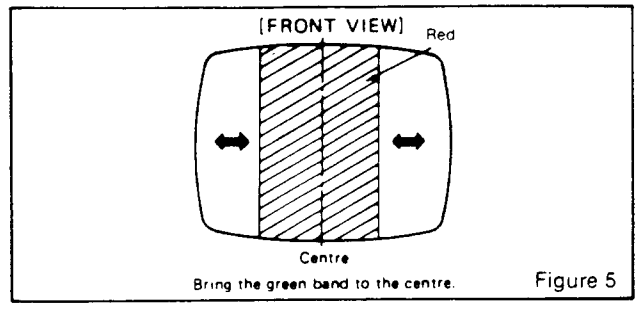
7.4 Turn off green input and turn on the red and blue input.

7.5 Rotate the 4-pole (middle) pair of magnets as a unit to minimize separation of the red and blue crosshatch lines around the center of the screen (Figure 6). Variation of the angle between the tabs adjusts convergence of red and blue. (Tilt yoke as required to converge red and blue at the edges as in 7.3 above.)

7.6 Turn on green input to obtain magenta (red/blue) and green crosshatch lines. Rotate the 6-pole (rear) pair of magnets as a unit to minimize separation of the magenta and green lines (figure 7). Vary angle between the two tabs and further rotate as a unit to finalize.

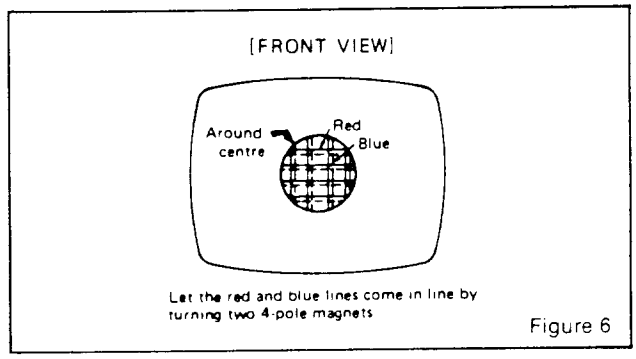
7.7 When convergence of 3 colors is optimized (static in center and dynamic around edges) apply stripe of paint or nail polish to convergence magnet rings to prevent movement. If applicable, tighten locking ring carefully.

7.8 Remove temporary wedge from yoke. Tilt yoke in up-down and left-right direction for best circumference convergence and install 3 wedges. (It is best to use 3 new wedges since they have adhesive backing. Simply pull off tape, slide wedge in place and press outer flap down firmly. For more



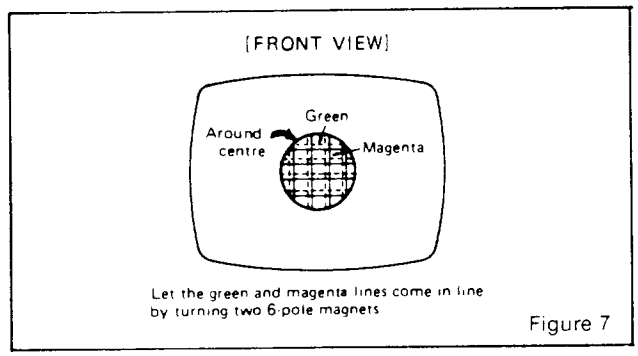
Bring the green band to the centre.

Figure 5



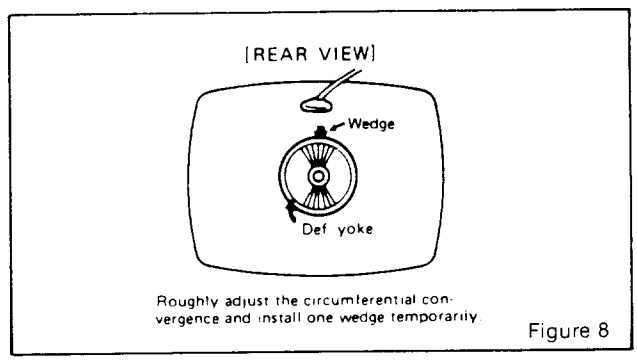
Let the red and blue lines come in line by turning two 4-pole magnets

Figure 6



Let the green and magenta lines come in line by turning two 6-pole magnets

Figure 7



Roughly adjust the circumferential convergence and install one wedge temporarily

Figure 8

permanency apply small quantity of silasitc or similar material at junction of wedges and picture tube. Do not disturb while material is setting. (Order wedges by part number 39-1233-01).

8.0 White Balance (Grey Scale Tracking)

Refer to figure 3. Do the following in subdued light.

8.1 Note this adjustment can be accomplished with no signal connected; eg: input connector open or if a signal generator is connected, switch off all 3 inputs at the generator.

8.2 Set red and green drive controls to their mechanical center and turn the common G2 screen control and 3 cut-off controls to minimum (fully clockwise).

8.3 Slowly turn up G2 screen control until the first faint color appears, then back off to edge of visibility. Do not touch the associated cut-off control - it should stay fully CCW for the remaining set-up.

8.4 Slowly turn up the other two color cut-off controls in turn to match the first. This should result in the faintest grey.

8.5 Turn on the signal generator with all 3 inputs on. (a crosshatch pattern would be appropirate).

8.6 Adjust the red and green drive controls for "neutral white" on high white picture areas. Generally these controls will be left at mech. centre.

8.7 Note; When monitor is re-connected with the terminal the screen control (G2) may require a slight adjustment to obtain proper black level. (the black portion of picture just extinguished).

9.0 Focus

Adjust focus control for best overall definition and picture detail on average signal applied. (Highlights should be favoured.)

10.0 Color Service Generator for ECM1302 Monitor

Electrohome has developed a color service generator that is specifically designed for use with the RGB color data monitor. It provides the monitor with both horizontal and vertical sync, as well as the following test patterns:

1) Fine cross-hatch pattern
2) Broad bar cross-hatch pattern
3) Complete field

Three color selection switches, red, green and blue, provide the ability to display the above patterns in the three primary colors as well as the three secondary colors.

This product may be ordered from:

Commercial Marketing
ELECTROHOME Electronics
809 Wellington St. North
Kitchener, Ontario
Canada N2G 4J6
Telephone: (519) 744-7111

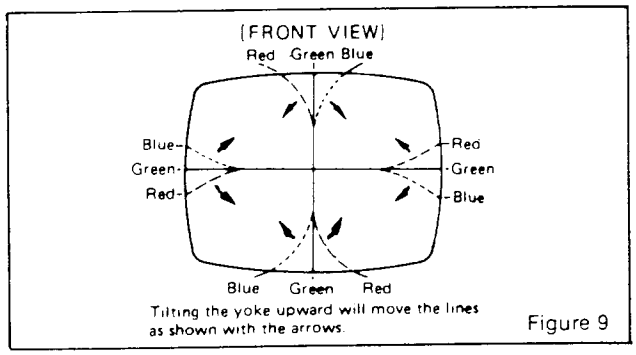


Figure 9

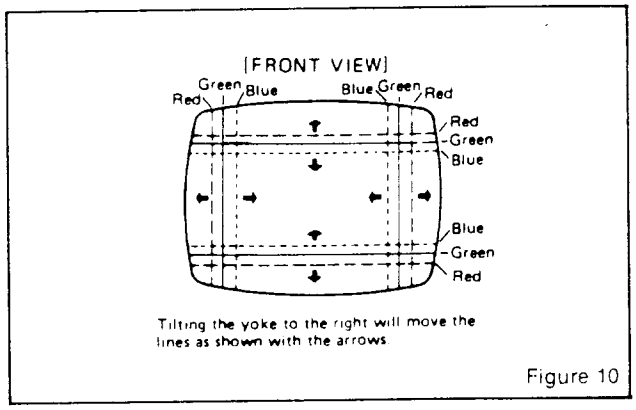


Figure 10

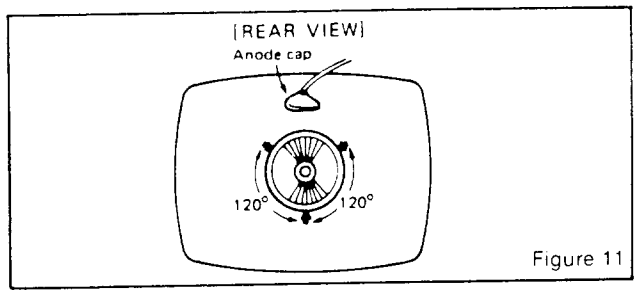


Figure 11

11.0 X-Ray Emission Check

1.1 Assure that the anode voltage does not exceed max.

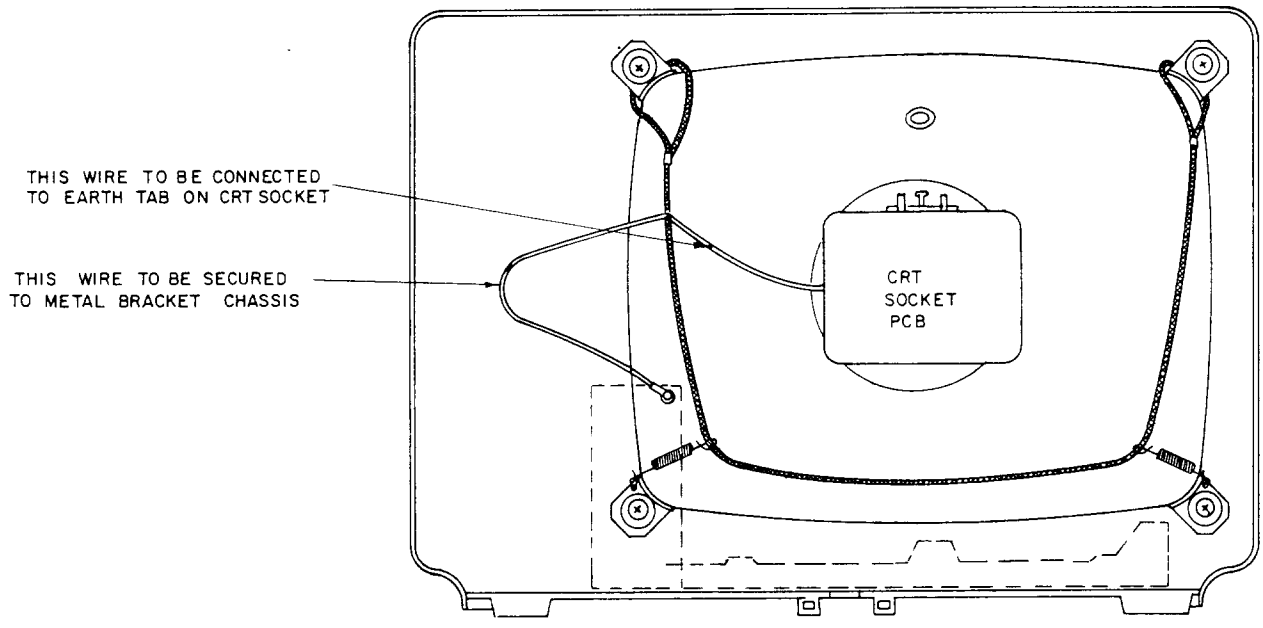
1.2 Assure that the high voltage hold down circuit is operating correctly. Use the following procedure.

a) Increase the B1 greater than 138.5V by shorting collector/emitter of the power regulator, X04.

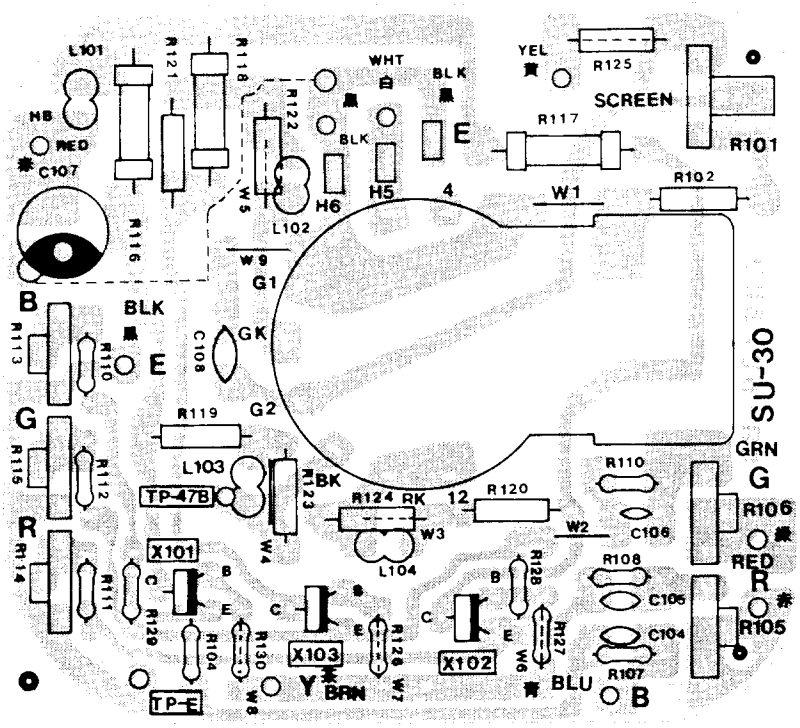
b) Observe that the anode voltage (EHT) goes to 0. If the EHT does not go to 0, a fault must be located and repaired.

c) Remove short and set should return to normal operation. (Note, after the short is removed some monitors may not restart. In this case, remove power from monitor momentarily and normal operation will be restored.

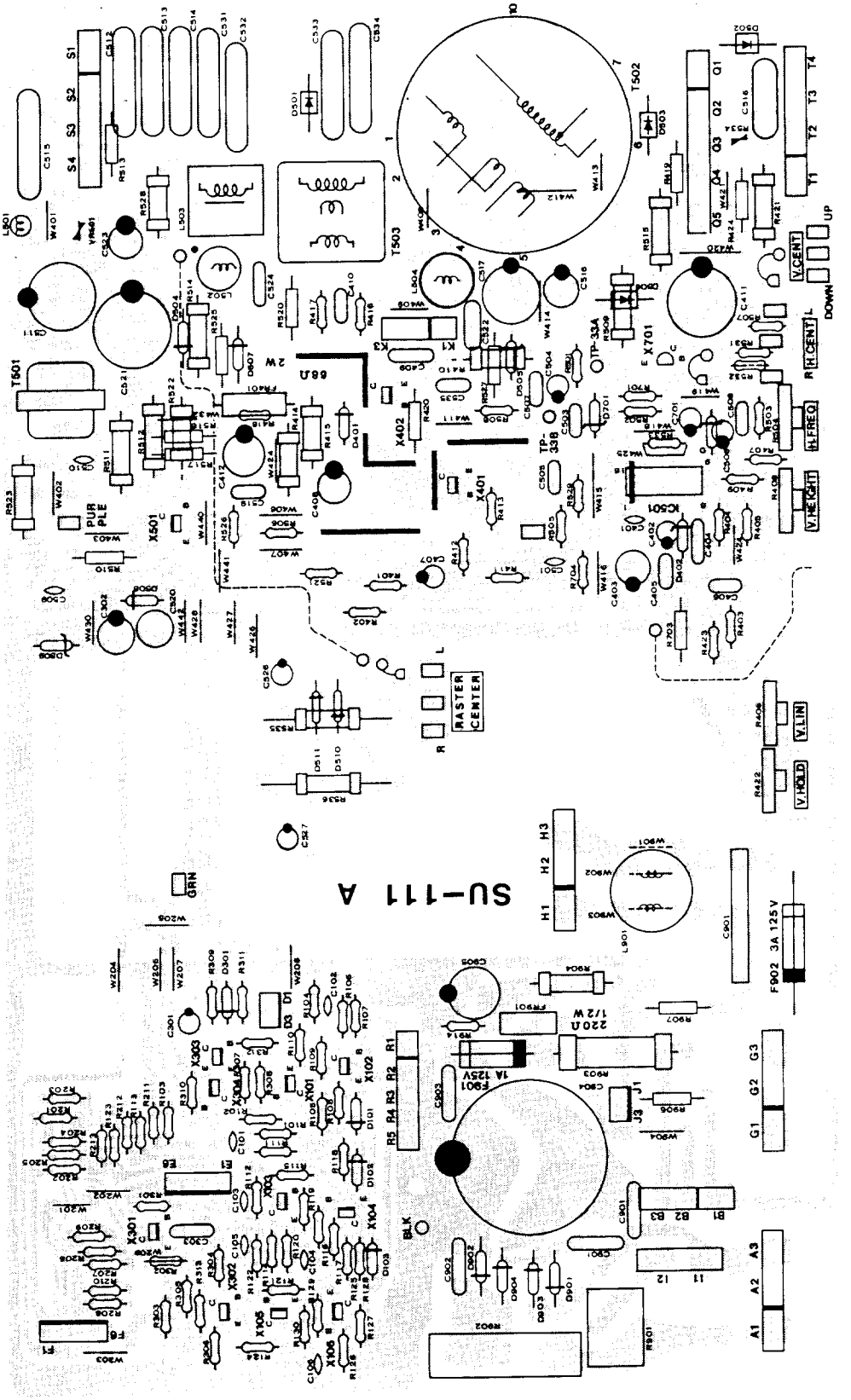
AQUADAC GROUND STRAP POSITION


THIS WIRE TO BE CONNECTED TO EARTH TAB ON CRT SOCKET
THIS WIRE TO BE SECURED TO METAL BRACKET CHASSIS
CRT SOCKET PCB
00-16267-01

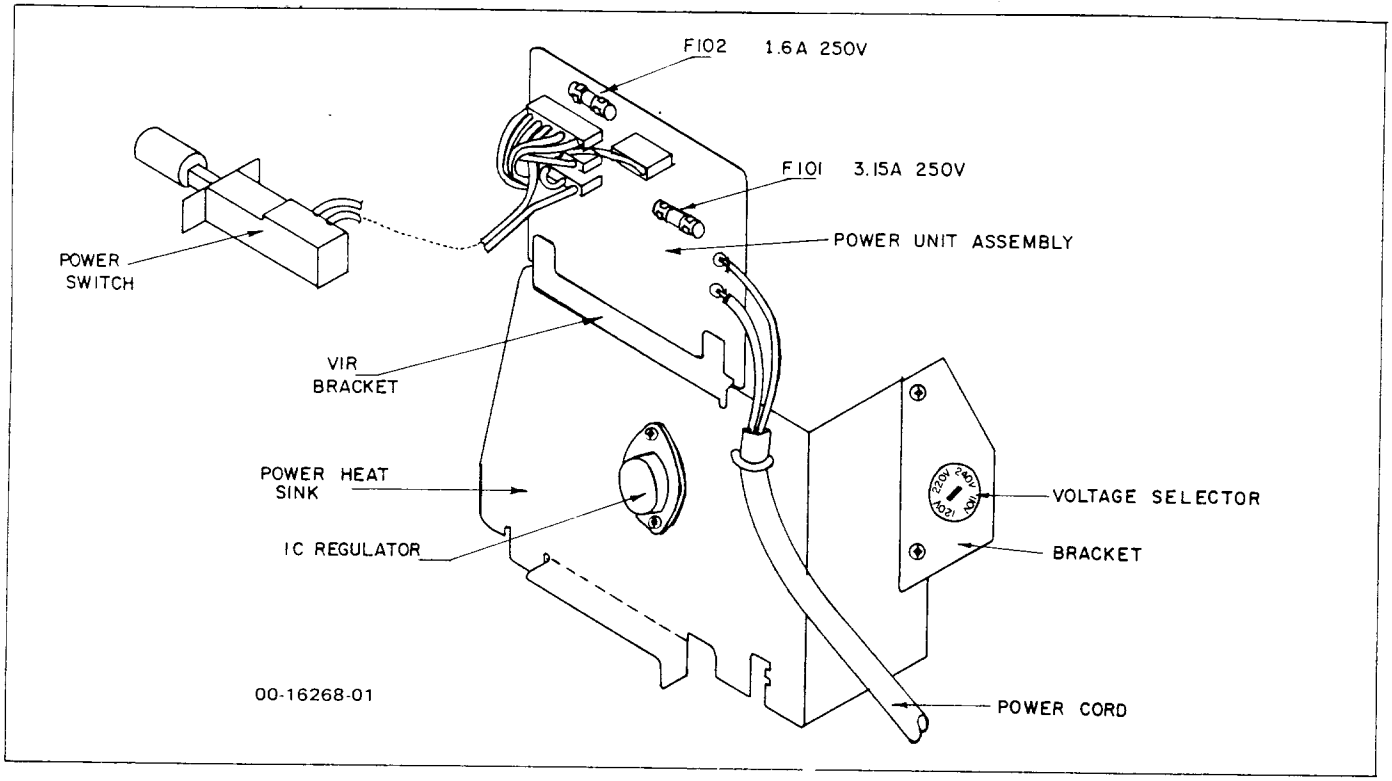
CRT PCB COMPONENT LAYOUT



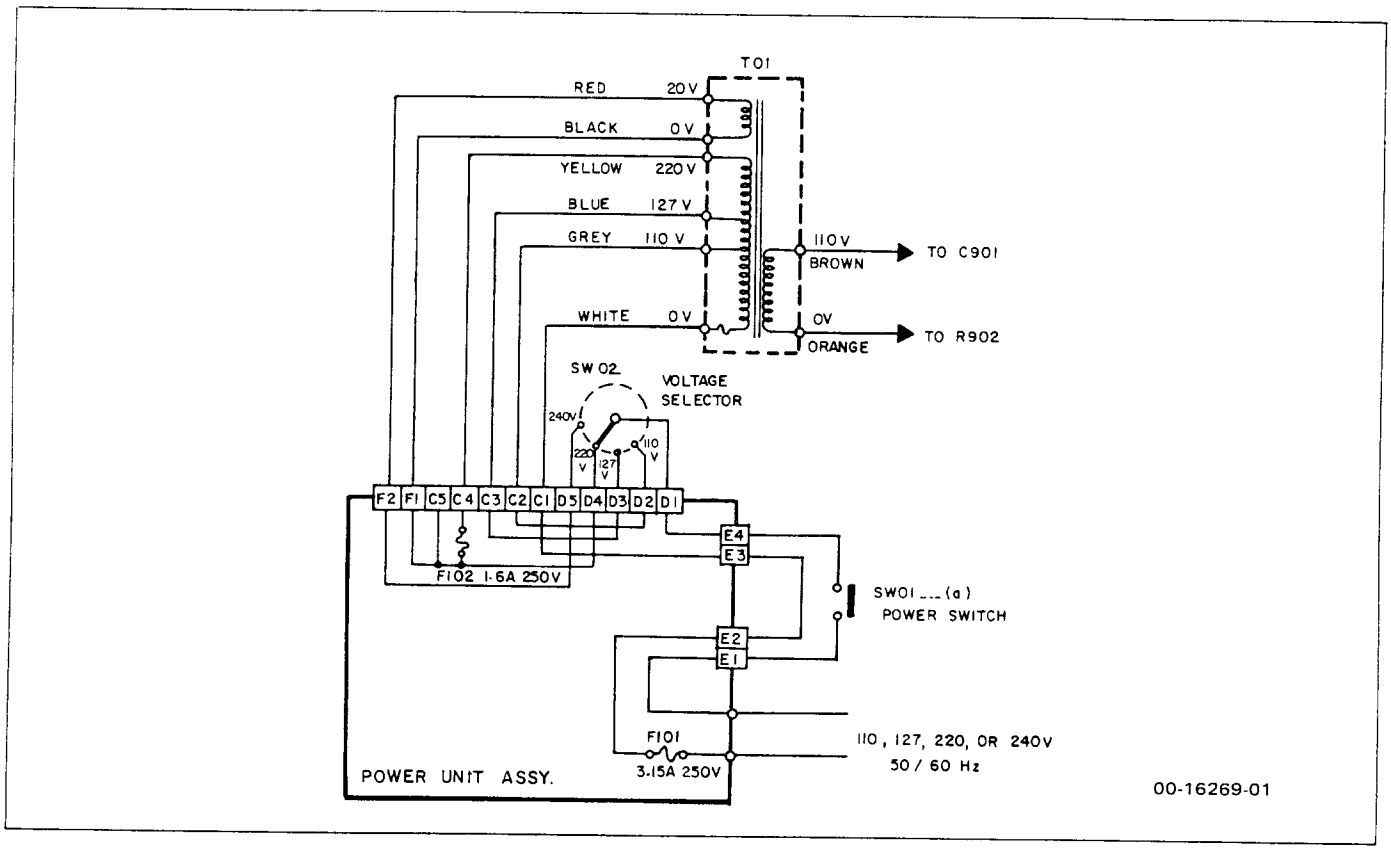
MAIN PCB COMPONENT LAYOUT



G12-102 and 103 POWER ASSEMBLY



G12-102 and 103 POWER TRANSFORMER and SELECTOR SWITCH SCHEMATIC



CHASSIS PARTS

Symbol	Description	Reference Number	Part Number	ECM1302-1 (G12-002)	ECM1302-1X (G12-102)	ECM1302-2 (G12-003)	ECM1302-2X (G12-103)
MECHANICAL							
	Front Panel Assy (Mask)	A17235-AAVO-MP	ZS-5-37	X	X		
	Front Panel Assy (Mask)	A17235-ACVO-MP	ZS-5-38			X	X
	Control Panel	CM30203-001	ZS-274-12	X	X		
	Control Panel	CM30203-002	ZS-274-13			X	X
	Earphone Plate	A38215-11	ZS-176-97	X	X	X	X
	Nameplate, ("RGB COLOR")	CM40793-001	ZS-274-15			X	X
	Nameplate, "ELECTROHOME"	C40329-2	ZS-274-16	X	X		
	Knob, Power ON/OFF	CM40443-00A	ZS-32-18	X	X	X	X
	Knob, Brightness	A48555L	ZS-29-10	X	X	X	X
	Cabinet, Rear	A17232-AJVO-MP	ZS-33-13	X	X	X	X
	Rating Label	CM20112-001	ZS-173-23	X			
	Rating Label		ZS-173-25		X		
	Rating Label	CM20112-003	ZS-173-24			X	
	Rating Label		ZS-173-26				X
	Tapping Screw x5	GBSB4010Z	ZS-156-06	X	X	X	X
	Tapping Screw x2	GBSB3010Z	ZS-156-17	X	X	X	X
	Carton, Plain	AP2782	ZS-176-99	X	X	X	X
ELECTRICAL							
	Main PCB Assy	SU1110A	ZS-1-34	X	X		
	Main PCB Assy	SU1111A	ZS-1-35			X	X
	CRT Socket PCB	SU3016A	ZS-3-12	X	X		
	CRT Socket PCB	SU3110B	ZS-3-15			X	X
V01	CRT Assy	370ESB22	ZS-7-08	X	X		
V01	CRT Assy	370LJB22	ZS-7-07			X	X
L01	Degaussing Coil	C30172-C	ZS-8-04	X	X	X	X
F01	Fuse, 3A 125V	QMF66U1-3R0S	ZS-120-05	X		X	
F101	Fuse, 3.15A 250V	QMF51A2-3R15S	ZS-120-15		X		X
F102	Fuse, 1.6A 250V	QMF51A2-1R6S	ZS-120-16		X		X
IC01	Voltage Regulator	STR383	XQ-STR383	X	X	X	X
R05	Resistor, 220n 25W	QRF258K-221	ZS-19-03	X	X	X	X
T01	Power Transformer	CE30025-00A	ZS-18-15	X		X	
T01	Power Transformer	CE30016-00B	ZS-18-16		X		X
SW01	Switch, ON/OFF	AX49239	ZS-111-08	X		X	
SW01	Switch, ON/OFF		ZS-111-15		X		X
SW02	Switch, Volt Select	QSR0074-014	ZS-111-16		X		X
R01	Control, Brightness, 10K	QVA4A4B-014M	ZS-124-06	X	X	X	X
NE01	Neon Lamp, Power	QLZ9015-001	ZS-14-03	X	X	X	X
	Neon Lamp Holder	C40433	ZS-176-98	X	X	X	X
	Jewel, Neon Lamp	A48388-4	ZS-274-14	X	X	X	X
	AC Power Cord	AX49361	ZS-135-05	X	X	X	X
	Connector, 7 pin "DIN"	QMC0789-003	ZS-93-08	X	X	X	X
	Connector, 15 pin "D"	CH40300-015P	ZS-93-07	X	X	X	X
R11	Focus Control	CJ40061-00A	ZS-85-10	X	X		
R11	Focus Control	CJ40059-00A	ZS-85-11			X	X
C01	Ceramic, 150pF, 1.5KV	QCZ0101-005	XL-S151-01	X	X	X	X
X01	Transistor, Hor. Output	2SD869	XQ-2SD869	X	X	X	X

MAIN PCB ASSEMBLY (G12-002 ECM1302-1/G12-102 ECM1302-1X SU1110A)
(G12-003 ECM1302-2 /G12-103 ECM1302-2X SU1111A)

RESISTORS

Symbol	Description	Reference Number	Part Number
R410	Metal Film, 6R8 1W 5%	QRX019J-6R8	XH-689-03
R414	Metal Oxide, 3K3 1W 5%	QRG019J-332	XH-332-03
R415	Metal Oxide, 2K7 1W 5%	QRG019J-272	XH-272-03
R421	Metal Oxide, 12K 2W 5%	QRG029J-123	XH-123-04
R503	Metal Film, 11.8K 1/4W 2%	QRV141F-1182	ZS-116-05
R509	Metal Oxide, 10K 2W 5%	QRG029J-103	XH-103-04
R511	Metal Oxide, 5K6 2W 5%	QRG029J-562	XH-562-04
R514 (SU1110A)	Metal Oxide, 390 2W 5%	QRG029J-391	XH-391-04
R514 (SU1111A)	Metal Oxide, 560 2W 5%	QRG029J-561	XH-561-04
R515 (SU1110A)	Metal Oxide, 10n 1W 5%	QRG019J-100	XH-100-03
⚠R515 (SU1111A)	Metal Oxide, 12n 1W 5%	QRG019J-120	XH-120-03
R522	Metal Film, 4R7 1W 5%	QRX019J-4R7	ZS-141-01
R523	Metal Oxide, 56 2W 5%	QRG029J-560	XH-561-04
R528	Metal Oxide, 390 1W 5%	QRG019J-391	XH-391-03
R534 (SU1111A)	ZNR	ERZ-C05ZK471	ZS-42-04
VR501	ZNR	ERZ-C050K271	ZS-42-03
VR502 (SU1111A)	ZNR	ERZ-C050K271	ZS-42-03
R703	Metal Film, 39K 1/2W 1%	QRV121F-3902	ZS-96-01
R704	Metal Film, 7.6K 1/4W 1%	QRV141F-7681	ZS-116-07
R902	Wirewound, 2R 7W 10%	QRF076K-2R0	ZS-125-02
R903 (SU1110A)	Metal Film, 4R7 3W 5%	QRX039J-4R7	ZS-94-03
R903 (SU1111A)	Metal Film, 5R6 3W 5%	QRX039J-5R6	ZS-94-07
R904	Metal Oxide, 10K 2W 5%	QRG029J-103	XH-103-04
R906	Carbon Comp, 39K 1/2W 10%	QRC122K-393	XH-393-02

CONTROLS

Symbol	Description	Reference Number	Part Number
R406	Vert. Lin., 200R	QVZ3230-022	ZS-80-25
R408	Vert. Height, 200R	QVZ3230-022	ZS-80-25
R422	Vert. Hold, 10K	QVZ3224-014H	ZS-80-40
R504	Hor. Freq. 5K	QVZ3230-053	ZS-80-12

CAPACITORS

Symbol	Description	Reference Number	Part Number
C402	Tantalum, 2U2 16V 10%	QEE51CK-2258	XI-T226-05
C411	Electrolytic, 100μF 160V	QET52CR-107	XI-101-11
C412	Electrolytic, 3V3 160V	QET52CR-385	XI-336-11
C508	Polypropylene, 5600pF 50V	QFP31HJ-562	ZS-73-02
C511	Electrolytic, 47μF 160V	QET52CR-476	XI-470-11
C512	Polypropylene, 2000pF, 1.5KV 5%	QFZ0082-202	ZS-71-09
C513 (SU1110A)	Polypropylene, 1000pF, 1.5KV 5%	QFZ0082-102	ZS-71-22
C513 (SU1111A)	Polypropylene, 2000pF, 1.5KV 5%	QFZ0082-202	ZS-71-09
C514 (SU1110A)	Polypropylene, 1800pF, 1.5KV 5%	QFZ0082-182	ZS-71-17
C514 (SU1111A)	Polypropylene, 1500pF, 1.5KV 5%	QFZ0082-152	ZS-71-10
C515	M.P.P, 0.4μF 200V 10%	QFZ0067-404	ZS-71-21
C520	Bipolar, 1μF 50V	QEN51HA-105	XK-N106-07
C523	Electrolytic, 1μF 160V	QET52CR-105	XI-106-11
C526, C527	Electrolytic, 1μF 250V	QET52ER-105	XI-106-13
C904	Electrolytic, 600μF 200V	QEY0034-001	ZS-52-02
C905	Electrolytic, 10μF 250V	QET52ER-106	XI-100-13

COILS & TRANSFORMERS

Symbol	Description	Reference Number	Part Number
T501	Horiz. Drive Transformer	A46022-BM	ZS-113-02
T502	Horizontal Output XFMR	CJ20046-00A	ZS-65-16
T503	Side Pin Transformer	C39049A or C39050A	ZS-66-04
⚠L502	Linearity Coil	CE40052-001	ZS-77-06
⚠L503	Width Coil	CJ30164-00A	ZS-76-05
L504 (SU1110A)	Heater Choke, 22	C30333A	ZS-79-05
L504 (SU1111A)	Heater Choke, 14	CJ30030-014	ZS-79-08

MAIN PCB ASSEMBLY (Cont'd)

DIODES

Symbol	Description	Reference Number	Part Number
D101, D102, D103	Diode, W06A, IS2473H		XQ-W06A
D303, D401	Diode, IS2473H		XQ-1S2473
D402	Zener, RD10F (C)		XQ-RD10FC
D503	Diode, HF1, RF1 or UF-2		XQ-HF1
D504	Diode, V09E		XQ-V09E
D505	Zener, RD11E(B)		XQ-RD11EB
D506	Diode, W06A		XQ-W06A
D507, D510, D511	Diode, ISS1, V09E		XQ-V09E
D508	Diode, IS2473H		XQ-IS2473
D701	Zener, RD20EV2		XQ-RD20EV2
D901, D902, D903, D904	Rectifier, 181887A, RM-2C		XQ-ISI887A

TRANSISTORS

Symbol	Description	Reference Number	Part Number
X101, X103, X105	Transistor, 2SC1685(R)		XQ-2SC1685R
X102, X104, X106	Transistor, 2SA1015(Y, GR)		XQ-2SA1015
X301, X302, X304	Transistor, 2SC454C, 2SC1685(R)		XQ-2SC1685R
X303	Transistor, 2SA673, 2SA1015(Y, GR)		XQ-2SA1015
X401, X402	Transistor, 2D401, 2SD478, 2SD1138		XQ-2SD401
X501	Transistor, 2SC2371V		XQ-25C2371
X701	Transistor, 2SC454C, 2SC1685(P-S)		XQ-2SC1685P

INTEGRATED CIRCUITS

Symbol	Description	Reference Number	Part Number
IC501	Horizontal & Vertical IC	HA11244	XQ-HA11244

MISCELLANEOUS

Symbol	Description	Reference Number	Part Number
FR401	Fusible Resistor, 68n 2W	QRH021J-680M	ZS-41-09
FR901	Fusible Resistor, 220n 1/2W	QRH121J-221M	ZS-41-12
R901	Posistor	A75414	ZS-55-03
F901	Fuse 1A 250V	QMF53U1-1R0S	ZS-120-09

CRT SOCKET PCB ASSEMBLY SU3016A (G12-002 ECM1302-1/G12-102 ECM1302-1X)

CONTROLS

Symbol	Description	Reference Number	Part Number
R105	Red Drive, 200R	QVZ3234-022	ZS-80-37
R106	Green Drive, 200R	QVZ3234-022	ZS-80-37
R113	Blue Cut-off, 5K	QVZ3234-053	ZS-80-36
R114	Red Cut-off, 5K	QVZ3234-053	ZS-80-36
R115	Green Cut-off, 5K	QVZ3234-053	ZS-80-36

RESISTORS

Symbol	Description	Reference Number	Part Number
R116, R117, R118	Metal Oxide, 10K 2W 5%	QRG029J-103	XH-103-04
R119, R120, R121	Carbon Comp. 3K3, 1/2W 10%	QRZ0039-332	XH-332-02

CAPACITORS

Symbol	Description	Reference Number	Part Number
C107	Electrolytic, 10μF 250V	QET52ER-106	XI-100-13
C108	Ceramic, 1000pF 1400V	QCZ9001-102M	ZS-56-05

TRANSISTORS

Symbol	Description	Reference Number	Part Number
X101, X102, X103	Video Outputs, 2SC2068	2SC2611	XQ-2SC2611

MISCELLANEOUS

Symbol	Description	Reference Number	Part Number
	CRT Socket	A75522	ZS-78-05
L101	Peaking Coil, 56	QQL043K-560	ZS-138-18

CRT SOCKET PCB ASSEMBLY SU3110B (G12-003 ECM1302-2/G12-103 ECM1302-2X)

CONTROLS

Symbol	Description	Reference Number	Part Number
R107	Red Drive, 200n	QVZ3234-022	ZS-80-37
R108	Green Drive, 200n	QVZ3234-022	ZS-80-37
R113	Red Cut-off, 5K	QVZ3234-053	ZS-80-36
R114	Green Cut-off, 5K	QVZ3234-053	ZS-80-36
R115	Blue Cut-off, 5K	QVZ3234-053	ZS-80-36

RESISTORS

Symbol	Description	Reference Number	Part Number
R116, R117, R118	Metal Oxide, 8K2 2W 5%	QRG029J-822	XH-822-04
R122, R123, R124	Carbon Comp. 3K3 1/2W 10%	QRZ0039-332	XH-332-02

CAPACITORS

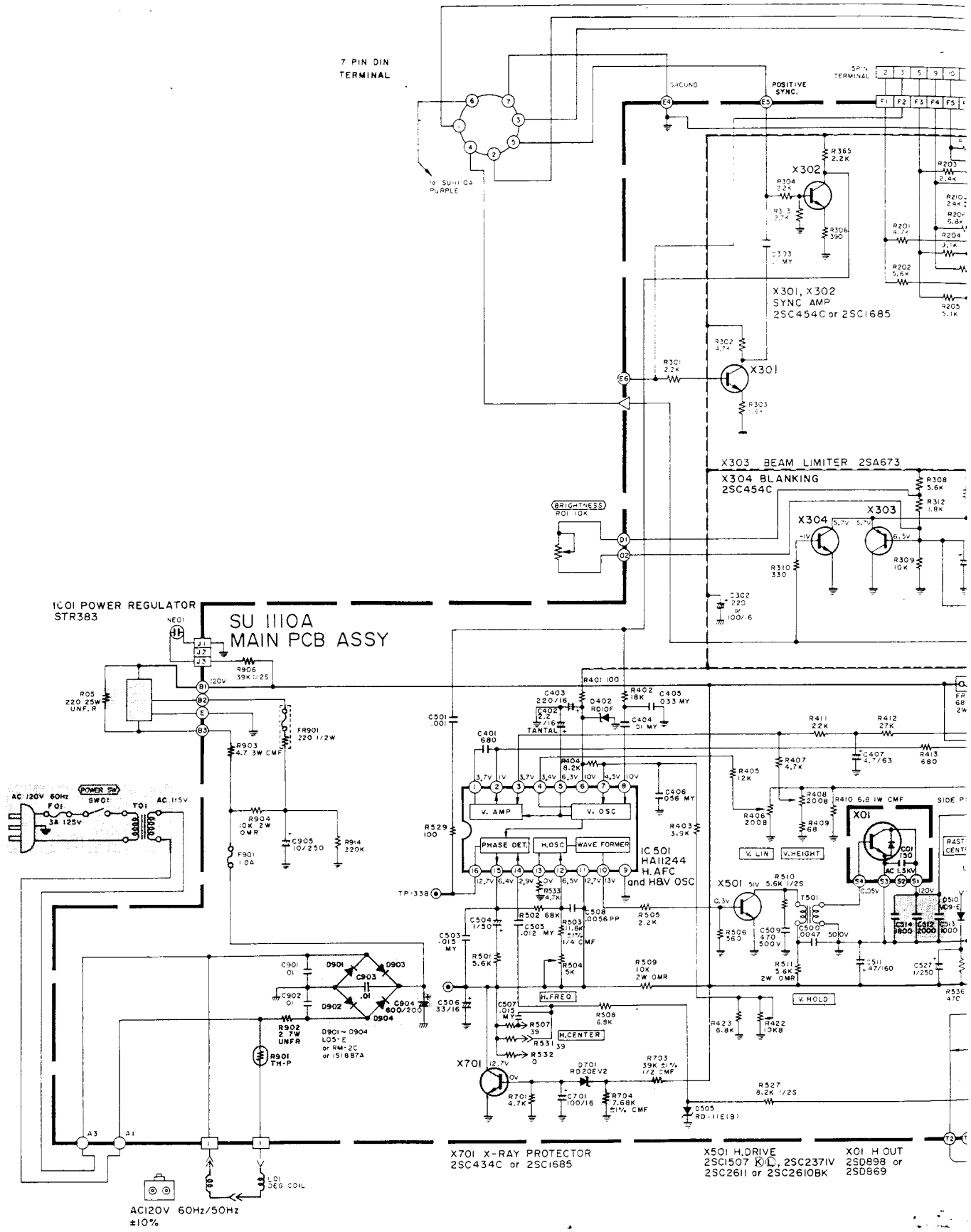
Symbol	Description	Reference Number	Part Number
C108	Ceramic, .001μF 150VAC	QCZ9017-102M	ZS-56-05

TRANSISTORS

Symbol	Description	Reference Number	Part Number
X101, X102, X103	Video Output, 2SC1514VC		XQ-2SC1514V

MISCELLANEOUS

Symbol	Description	Reference Number	Part Number
	CRT Socket	A75522	ZS-78-05
L101, L102, L103	Peaking Coil, 56	QQL043K-560	ZS-138-18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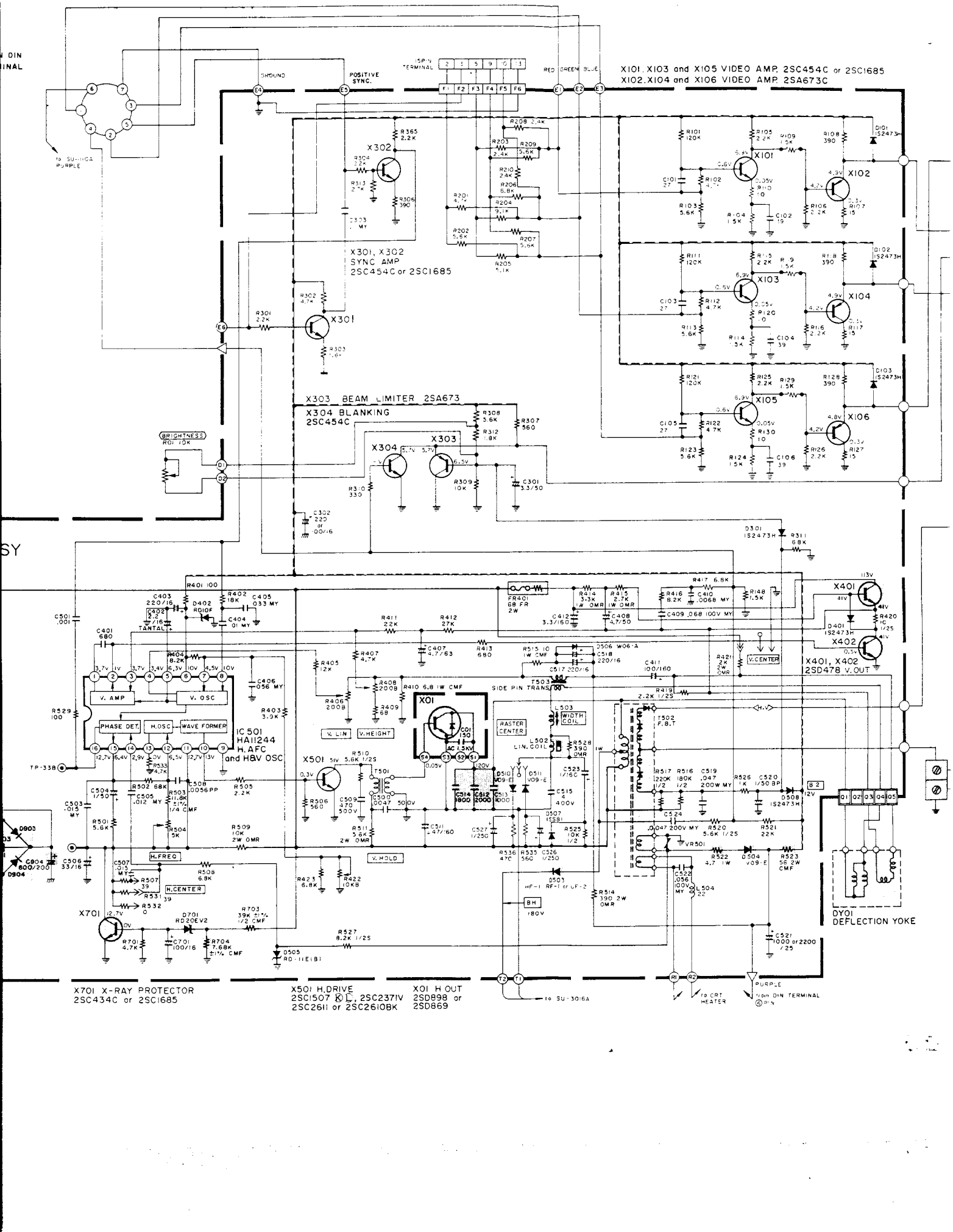
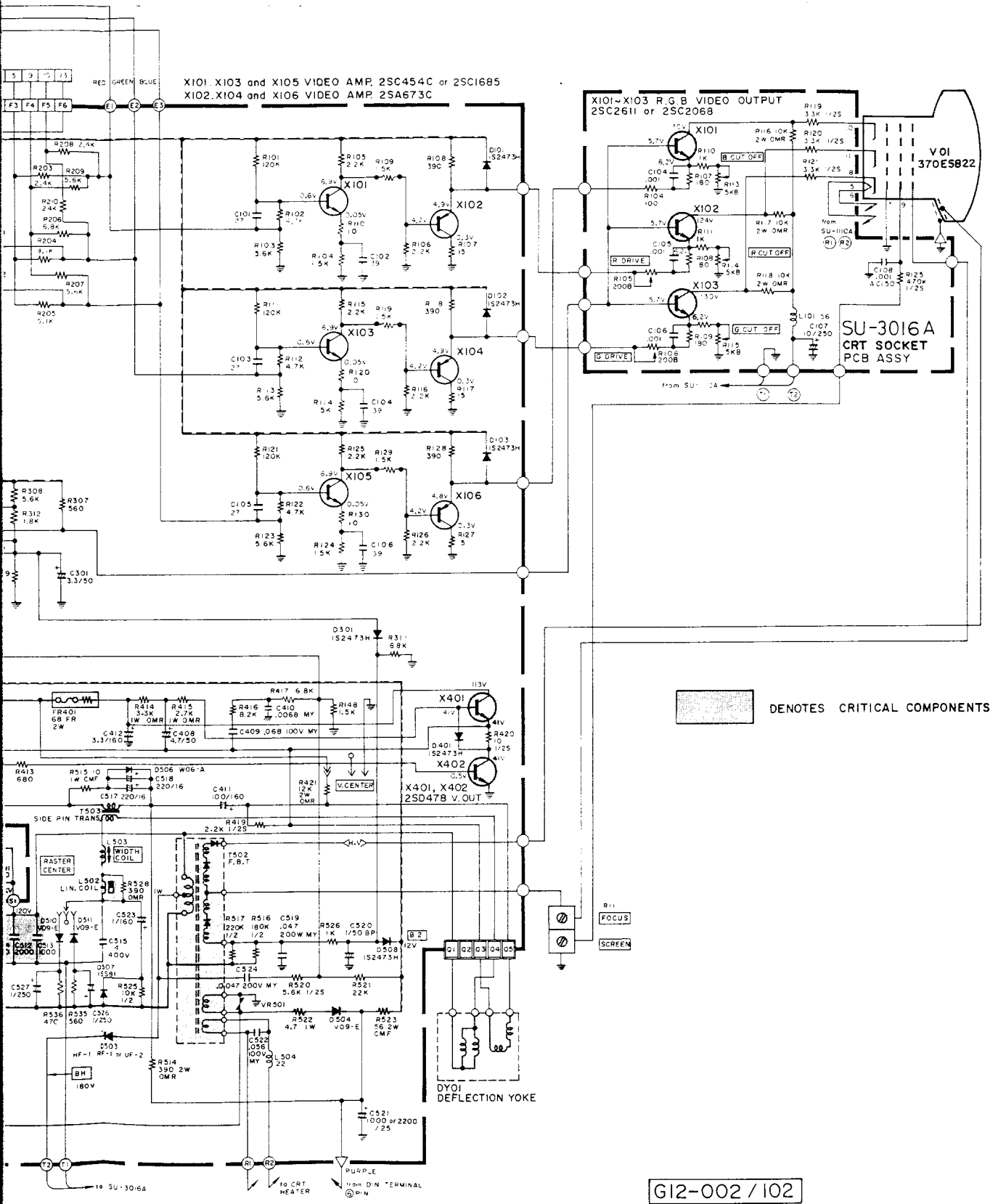
SU-1110A PURPLE
GROUND
POSITIVE SYNC.
52Pin TERMINAL
X302
X301, X302 SYNC AMP 2SC454C or 2SC1685
X301
X303 BEAM LIMITER 2SA673
X304 BLANKING 2SC454C
X303
BRIGHTNESS R01 10K
IC01 POWER REGULATOR STR383
SU 1110A MAIN PCB ASSY
AC 120V 60Hz
POWER SW
SW01
T01
AC 115V
F01 3A 125V
F901 1.0A
FR901 220 1/2W
V. AMP
V. OSC
PHASE DET.
H.OSC
WAVE FORMER
IC 501 HA11244 H.AFC and H&V OSC
V. LIN
V.HEIGHT
X01
X501
H.FREQ
H.CENTER
V. HOLD
X701
D901~D904 LO5-E or RM-2C or IS1887A
TH-P
L01 DEG COIL
AC120V 60Hz/50Hz ±10%
X701 X-RAY PROTECTOR 2SC434C or 2SC1685
X501 H.DRIVE 2SC1507 Ⓚ Ⓛ, 2SC2371V 2SC2611 or 2SC2610BK
X01 H OUT 2SD898 or 2SD869


X101, X103 and X105 VIDEO AMP. 2SC454C or 2SC1685
X102, X104 and X106 VIDEO AMP. 2SA673C
X301, X302
SYNC AMP
2SC454C or 2SC1685
X303 BEAM LIMITER 2SA673
X304 BLANKING
2SC454C
IC 501
HA11244
H. AFC
and H&V OSC
X401, X402
2SD478 V. OUT
X501 H. DRIVE
2SC1507 or 2SC2371V
2SC2611 or 2SC2610BK
X01 H OUT
2SD898 or
2SD869
X701 X-RAY PROTECTOR
2SC434C or 2SC1685
DY01
DEFLECTION YOKE
GROUND
POSITIVE SYNC.
RED
GREEN
BLUE
BRIGHTNESS
V. AMP
V. OSC
PHASE DET.
H. OSC
WAVE FORMER
V. LIN
V. HEIGHT
RASTER CENTER
SIDE PIN TRANS.
WIDTH COIL
LIN. COIL
V. HOLD
H. FREQ
H. CENTER
V. CENTER
H. V
B+
BH
180V
12V
PURPLE
to CRT HEATER
from DIN TERMINAL 2 PIN
to SU-3016A


X101 X103 and X105 VIDEO AMP. 2SC454C or 2SC1685
X102.X104 and X106 VIDEO AMP. 2SA673C
X101~X103 R.G.B VIDEO OUTPUT
2SC2611 or 2SC2068
V01
370ES822
SU-3016A
CRT SOCKET
PCB ASSY
DENOTES CRITICAL COMPONENTS
X401, X402
2SD478 V.OUT
DY01
DEFLECTION YOKE
SIDE PIN TRANS
RASTER CENTER
WIDTH COIL
LIN. COIL
V.CENTER
FOCUS
SCREEN
G12-002/102
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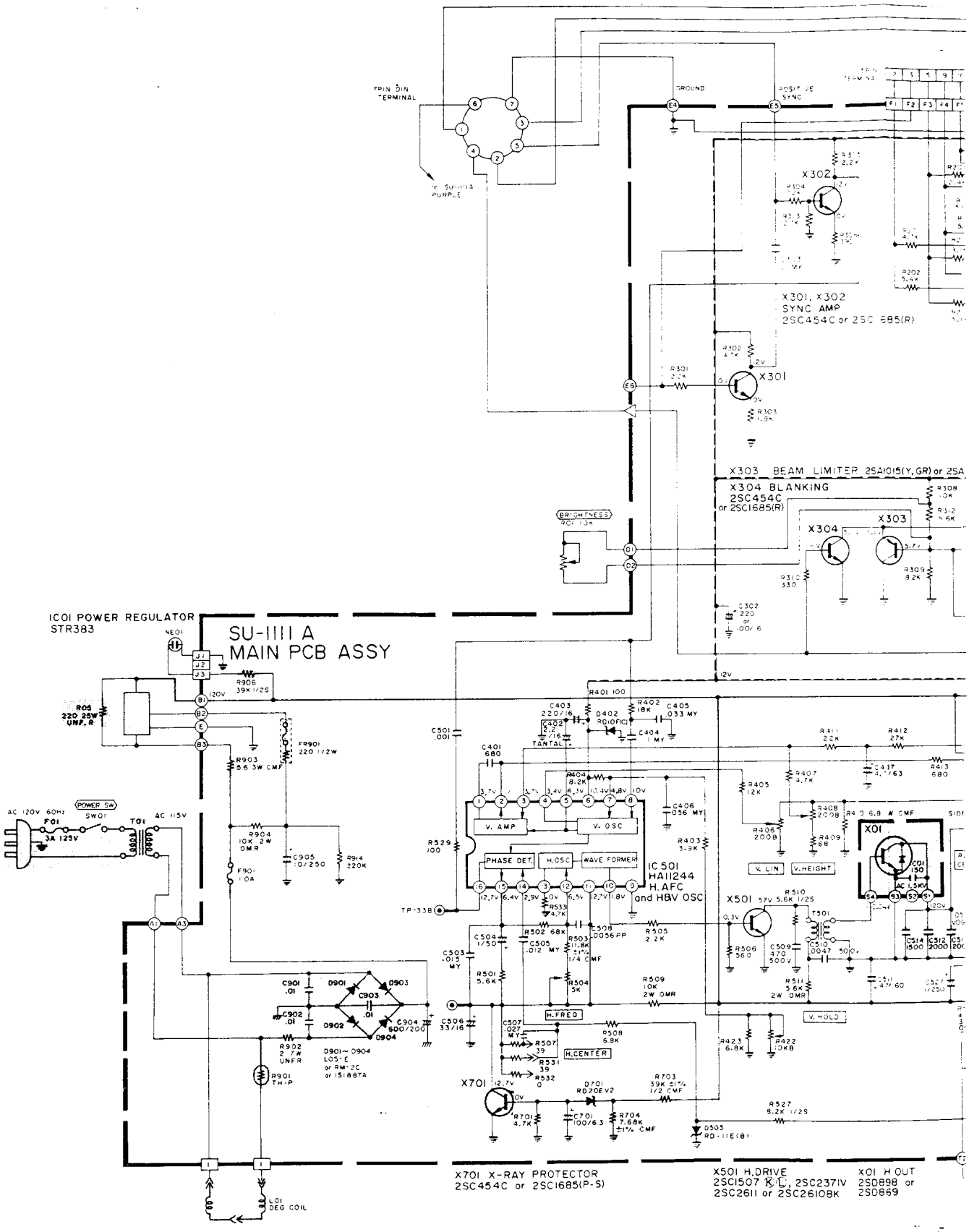
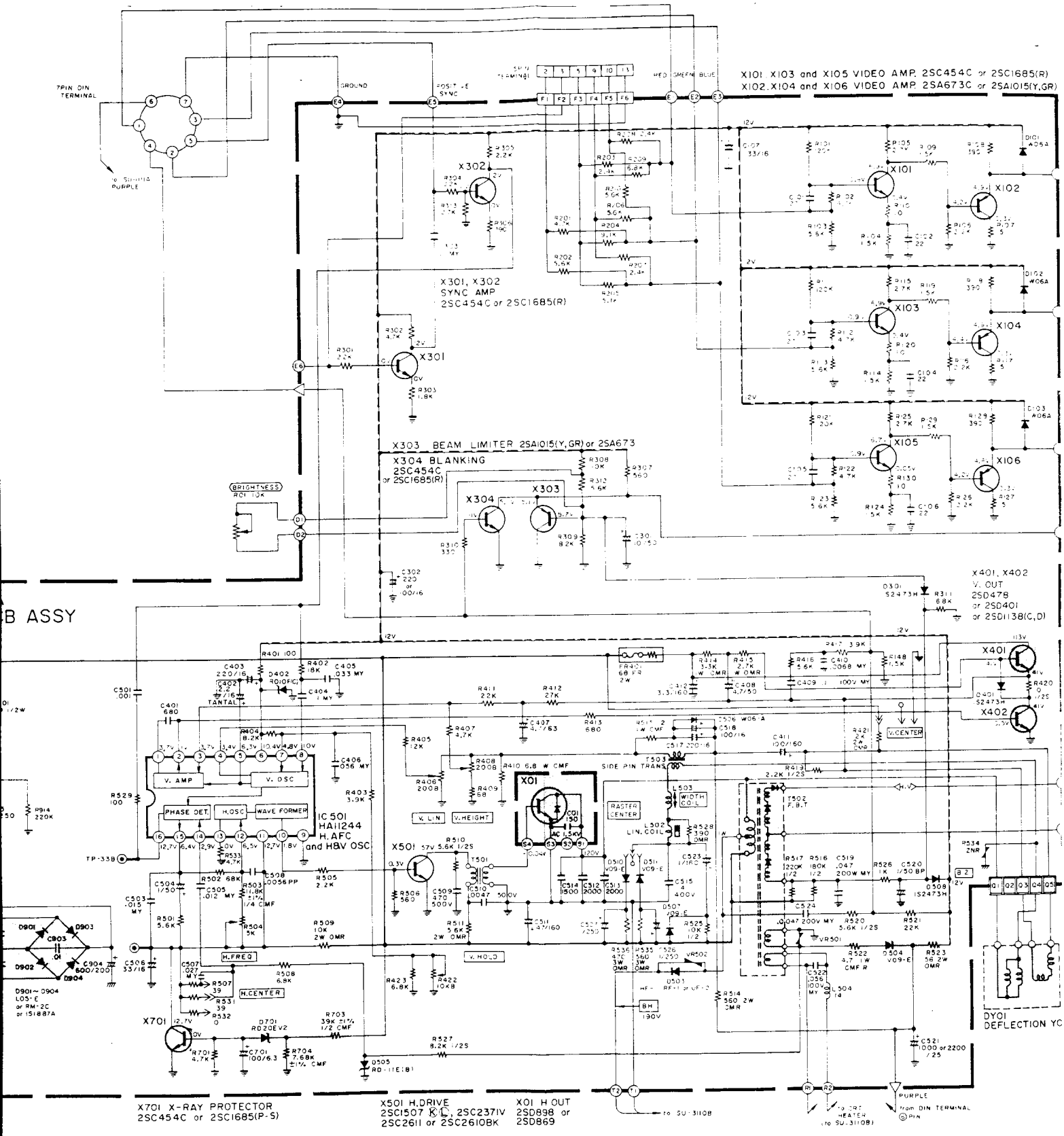
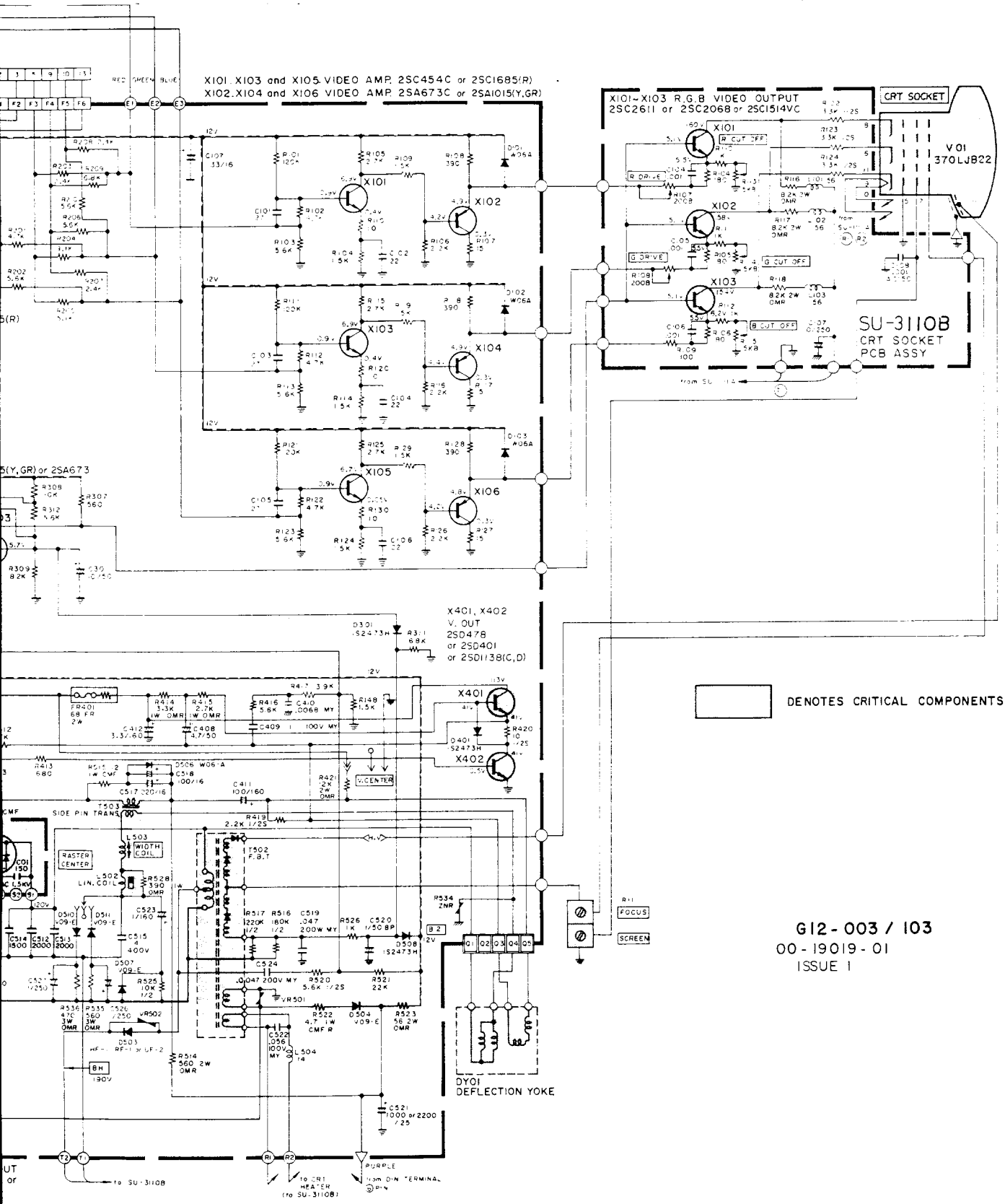
ISSUE 1


SU-1111 A
MAIN PCB ASSY
IC01 POWER REGULATOR
STR383
7PIN DIN TERMINAL
GROUND
POSIT'VE SYNC
X301, X302
SYNC AMP
2SC454C or 2SC 685(R)
X303 BEAM LIMITER 2SA1015(Y,GR) or 2SA
X304 BLANKING
2SC454C
or 2SC1685(R)
BRIGHTNESS
V. AMP
V. OSC
PHASE DET.
H.OSC
WAVE FORMER
IC 501
HA11244
H.AFC
and HBV OSC
V. LIN
V.HEIGHT
V. HOLD
H.FREQ
H.CENTER
AC 120V 60Hz
POWER SW
AC 115V
3A 125V
X701 X-RAY PROTECTOR
2SC454C or 2SC1685(P-S)
X501 H.DRIVE
2SC1507 K/L, 2SC2371V
2SC2611 or 2SC2610BK
X01 H OUT
2SD898 or
2SD869


X101 X103 and X105 VIDEO AMP. 2SC454C or 2SC1685(R)
X102.X104 and X106 VIDEO AMP. 2SA673C or 2SA1015(Y,GR)
7PIN DIN TERMINAL
GROUND
POSITIVE SYNC
SYNC TERMINAL
RED GREEN BLUE
X301, X302
SYNC AMP
2SC454C or 2SC1685(R)
X303 BEAM LIMITER 2SA1015(Y,GR) or 2SA673
X304 BLANKING
2SC454C
or 2SC1685(R)
BRIGHTNESS
X401, X402
V. OUT
2SD478
or 2SD401
or 2SD1138(C,D)
B ASSY
V. AMP
V. OSC
PHASE DET.
H.OSC
WAVE FORMER
IC 501
HA11244
H. AFC
and H&V OSC
V. LIN
V. HEIGHT
SIDE PIN TRANS
RASTER CENTER
H.FREQ
H.CENTER
V. HOLD
V.CENTER
X701 X-RAY PROTECTOR
2SC454C or 2SC1685(P-S)
X501 H.DRIVE
2SC1507 K,L, 2SC2371V
2SC2611 or 2SC2610BK
X01 H OUT
2SD898 or
2SD869
to SU-3110B
PURPLE
from DIN TERMINAL
DY01
DEFLECTION YC



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ISSUE 1